

**Agenda Item:**

**Source:** Panasonic

**Title:** On 3GPP TDD mode

**Document for:**

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**On 3GPP TDD mode**

**Abstract**

This document identifies the air interface differences between the ARIB and UTRA TDD modes. The concepts can be merged into a very effective 3GPP TDD mode.

**Introduction**

The new concept will benefit from the large amount of commonality between the two proposals as well as from the diversity of powerful techniques that can be utilised to address any operational requirement.

In the harmonisation process, particular attention should be paid to the deployment scenarios for TDD, the efficient use of TDMA and DCA (and the role of SHO), the possible reliance on technologies that may carry a complexity penalty, and the commonality with FDD – especially at the higher layers.

A detailed comparison is shown in Table 1 [1][2][3].

**References**

- [1] Volume 3: Specifications of Air-Interface for 3G Mobile System, Source: ARIB IMT-2000 AIF WG SWG2, AIF/SWG2-34-7
- [2] UTRA Physical Layer Description, TDD parts, V 0.2.1, Tdoc UMTS L1 274/98
- [3] List of agreed working assumptions for UTRA TDD, Tdoc UMTS L1 590/98

Table.1 Comparison Table of ARIB-TDD/UTRA-TDD

		ARIB-TDD	UTRA-TDD
Multiple Access		TDMA/CDMA	TDMA/CDMA
Band Width		5MHz (1.25/10/20)	5MHz
Chip Rate		4.096Mcps (1.024/8.192/16.384)	4.096Mcps
Roll-off Factor		0.22	0.22
Carrier Spacing		Flexible with 200kHz carrier raster	Flexible with 200kHz carrier raster
Inter BS Sync.		Synchronous	Synchronous
Cell Search Scheme		3 step code acquisition based on search codes	3 step code acquisition based on search codes
Frame Length		10ms	10ms
Slot Length		0.625ms (16slots)	0.625ms (16slot)
VSF(spreading code)		1-512	1-16
HO		SHO	HHO(SHO: FFS)
DL	Data mod.	QPSK	QPSK
	Spreading mod.	QPSK	QPSK (QP/2shifted-BPSK?)
	Spreading code	1 symbol length	1 symbol length
	Scrambling code	10ms (4096chips)	2-16chip
	Pilot structure	TCH dedicated time multiplexed pilot symbols	TCH dedicated, time multiplexed, special midamble for joint channel estimation
	Detection	Coherent based on Pilot Symbols	Coherent based on Midamble Special Sequence
	Power control	Closed-loop (0.1-0.8kbps DCH SIR based)	Closed-loop (0.1-0.8k cycles/sec)
	Variable rate concept	OVSF + VTS(Time slot)+ VMC(Multi-code)+ DTX	OVSF+VTS+VMC+ DTX
UL	Data mod.	QPSK	QPSK
	Spreading mod.	HPSK	QPSK ((P/2shifted-BPSK?)
	Spreading code	1 symbol length	1 symbol length
	Scrambling code	2 <sup>9</sup> x720ms	2-16chip
	Pilot structure	TCH dedicated time multiplexed pilot symbols	TCH dedicated, time multiplexed, special midamble for joint channel estimation
	Detection	Coherent based on Pilot Symbols	Coherent based on Midamble Special Sequence
	Power control	Fast Open-loop (Perch CH based) + Closed-loop (0.8-0.1kbps DCH SIR based)	Closed-loop (0.1-0.8k cycles/sec) Fast Open loop for further study
	Variable rate concept	VSF+ Rate Matching+ VMC	VSF+VTS(Time Slot)+ VMC
Cannel Coding		Convolutional code (R=1/2, 1/3, K=9) Turbo code (K=3,R=1/3,1/2) (Same as FDD)	Convolutional code RS code Turbo code
Interleaving		10/20/40/80ms	10-300ms
Rate Detection		TFCI(with/without Blind Detection)	TFCI
Other Features		SHO	DCA
Random Access		Message(10ms) SF=128, 32	Dedicated half slots
TPC		1dB(DL) 0.25dB(UL)	[0.5-3]dB
Super Frame Length		720ms	720ms